# Dilepton production in relativistic heavy-ion collisions *

*Volker Koch and Chungsik Song*

Recently the CERES-collaboration has reported [1] a considerable enhancement in the dilepton spectrum over a hadronic cocktail in the invariant mass range $300\,\mathrm{MeV} \leq M_{\mathrm{inv}} \leq 500\,\mathrm{MeV}$. Using a hadronic transport model we have calculated dilepton spectra using a wide range of initial conditions for the hadronic phase which are only constrained by the hadronic observables. The purpose of this exercise was twofold. First of all, we wanted to see to which extent the CERES data can be explained in a purely hadronic scenario including pion annihilation and other channels not included in the CERES cocktail. Secondly, we wanted to investigate to which extent a dilepton measurement puts additional constraints on the initial conditions of the hadronic phase. We found a very weak sensitivity of the dilepton invariant mass spectrum on the initial hadronic configurations (figure 1). As far as the CERES data are concerned we could reach the lower end of the sum of statistical and systematic error. It appears impossible, however, to explain the central points if they turn out to be correct after an improved measurement.

We also included the in-medium corrected pion annihilation cross section [2] into our calculation. While the pion-annihilation contribution is enhanced by a factor of about 2 in the low mass range, the total dilepton yield is only increased by 30 % and, thus our medium effect does not explain the CERES enhancement (figure 2).

We predicted no additional enhancement when going from the small system S+Au to the large system Pb+Pb. This is in agreement with preliminary data from the CERES collaboration [3].

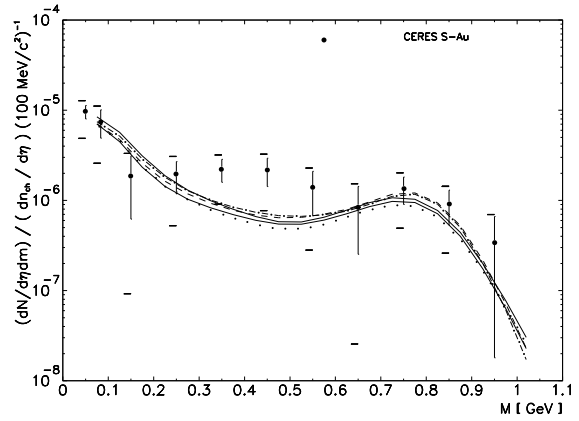


Figure 1: Dilepton invariant mass distribution for several initial hadronic configurations

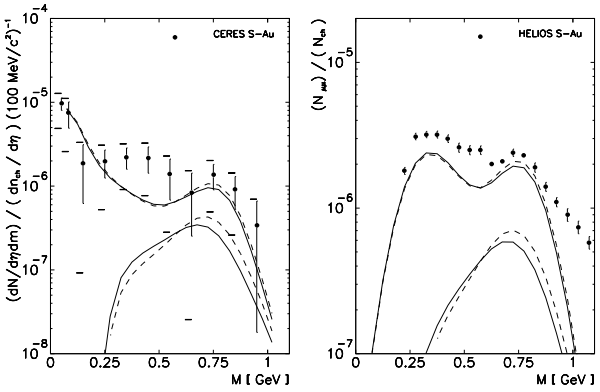


Figure 2: Dilepton invariant mass spectrum with (full line) and without (dashed line) in-medium corrected pion annihilation in comparison with CERES (left) and HELIOS [4] (right) data.

[1] G. Agakichiev et al., Phys. Rev. Lett. 75 (1995) 1272.
[2] C. Song, V. Koch, S.H. Lee and C.M. Ko, Phys. Lett. B366 (1996) 379.
[3] A. Drees, Proceedings Quark Matter '96, to appear in Nucl. Phys. A.
[4] M. Masera, Nucl. Phys. A590 (1995) 93c.

* LBNL-38619: Phys. Rev. C54 (1996) 1903.